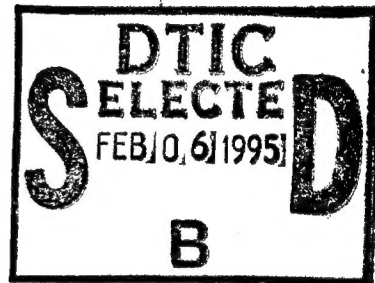Study Report 95-01

Critical Factors in the Art of Battle Command

James W. Lussier and Terrill F. Saxon
U.S. Army Research Institute

November 1994

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United States Army Research Institute
for the Behavioral and Social Sciences

U.S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Director

Research accomplished under contract
for the Department of the Army

Technical review by

Rex Michel
Julia Pounds

Accession For	
NTIS GRA&I	☑
DTIC TAB	☐
Unannounced	☐
Justification	

By
Distribution

Availability Codes	
	Avail and/or
Dist	Special
A-1	

NOTICES

REPORT DOCUMENTATION PAGE

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 1994, November	3. REPORT TYPE AND DATES COVERED Final Feb 94 – Jul 94

4. TITLE AND SUBTITLE
Critical Factors in the Art of Battle Command

5. FUNDING NUMBERS
65803D
730
1131H

6. AUTHOR(S)
Lussier, James W.; and Saxon, Terrill F.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Research Institute for the Behavioral and
　Social Sciences
Fort Leavenworth Research Unit, PERI-RK
Bldg 90, McClellan Avenue
Fort Leavenworth, KS 66027-0347

8. PERFORMING ORGANIZATION REPORT NUMBER
ARI Study Report
95-01

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Research Institute for the Behavioral and
　Social Sciences
ATTN: PERI-RZ
5001 Eisenhower Avenue
Alexandria, VA 22333-5600

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
--

11. SUPPLEMENTARY NOTES
--

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release;
distribution is unlimited.

12b. DISTRIBUTION CODE
--

13. ABSTRACT (Maximum 200 words)
　　This study report focuses on the re-emergence of the importance of the art of battle command and the factors critical to it. First, the conceptualization of battle command is discussed. Included in this discussion is how the concept of battle command differs from the concept of command and control, the consideration of battle command as an art and science, and the place of technology, information, and digitization in the concept of battle command. Drawing on National Training Center studies, traits of leaders, and the differences between experts and novices, the various competencies commonly associated with battle command are analyzed. In keeping with the current BCBL conceptualization of battle command, two fundamental aspects of battle command, leadership and decision making, are discussed. Research from both the military and non-military sector is presented on leadership and decision making and its relevance to battle command. Specifically, regarding leadership, the topics of leadership skills, leadership styles, communication, and training are discussed. With respect to decision making, the roles of intuitive and analytical judgments, planning and problem solving, critical thinking, and visualization are considered.

14. SUBJECT TERMS
Art of battle command　　Judgment: intuition and analysis
Decision making　　Critical thinking
Problem solving　　Leadership: skills, styles & traits

15. NUMBER OF PAGES
53

16. PRICE CODE
--

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

Study Report 95-01

Critical Factors in the Art of Battle Command

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Army Project Number 2Q665803D730	Personnel and Training Analysis Activities

One mission of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) Fort Leavenworth Field Unit is to conduct research that explores issues related to command and control (C^2). One issue given much attention in the recent past is "battle command." ARI has joined with other programs of research and Army educational institutions such as the National Training Center (NTC), Joint Readiness Training Center (JRTC), and U.S. Army War College in an attempt to gain a better understanding of what battle command comprises. This study report, entitled "Critical Factors in the Art of Battle Command," is part of a wider program of research called for by the attempt to separate the function of the battle commander from the larger and more support-oriented mechanisms of C^2 in which it has become enmeshed.

This report begins by defining battle command. In providing this definition, the topic of battle command as an art or science is discussed, as well as how battle command relates to C^2. The core competencies of battle command are also delineated. Under the two fundamental aspects of leadership and decision making, this report provides findings from military and non-military research in areas that relate to battle command competencies.

This effort was supported by the Battle Command Battle Laboratory (BCBL), Fort Leavenworth, Kansas.

EDGAR M. JOHNSON
Director

CRITICAL FACTORS IN THE ART OF BATTLE COMMAND

EXECUTIVE SUMMARY

Requirement:

Because of the recent re-emphasis on the function of the U.S. Army battle commander, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has joined other Army institutes and training centers in an effort to define what battle command comprises and how it differs from various Command and Control (C^2) functions. The major goal of this contribution is to study the concept of battle command and examine the core competencies of battle commanders.

Procedure:

Training and Doctrine Command activities involved in developing battle command concepts were consulted and military and non-military literature relevant to battle command competencies was read. Four main sections were derived that constitute the body of this study report.

Section one, "Battle Command," defines battle command in the context and in contrast to C^2. Whether battle command is best described as an art or science is also considered in this section. Finally in section one, the importance of technology, information war, and digitization to battle command are addressed.

In section two the competencies of battle command are considered. National Training Center studies are drawn upon as the topics of leader traits, intellect, study, and common sense are presented. Research regarding expert and novice differences are addressed in the context of battle command as well.

Sections three and four, "Leadership" and "Decision Making," deal with two fundamental aspects of the battle command function. Issues such as leadership skills and styles, communication and information flow, and training are discussed in "Leadership." Section four covers decision-making aspects such as judgment, intuition, analysis, planning and problem solving, critical thinking, and visualization.

Findings:

The concept of battle command is the art of motivating and directing soldiers and their organizations into actions that lead to the accomplishment of missions. Off-battlefield activities are also included in the concept of battle command, for example, the training of subordinates and actions during deployment.

There is no comprehensive set of qualifications that distinguish the complete battle commander. Instead, there are core competencies that pertain to leadership. The competencies include motivate the unit, control forces in battle, develop a climate for teamwork, make intent clear, react to the unexpected, and be decisive and resolute.

Battle command is divided into two fundamental aspects: Leadership and decision making. Leadership is defined as influencing the behavior of others in the furtherance of organizational goals. Decision making involves not only deciding but situation assessment, concept formation, planning, making judgments, visualization, and applying tactical and technical knowledge. Decision making means knowing what should be done, and leadership is the means to make it happen.

Battle commanders are leaders, and certain leadership skills (e.g., delegating and coaching) must be developed in the context of the appropriate leadership style. The battle commander is often faced with leading in a rapidly changing environment that calls for flexibility and a tolerance for ambiguity. Additionally, if the battle commander is to be a proficient leader, he must communicate effectively with his subordinates and realize the importance of training them.

Finally, leaders are inevitably called upon to make decisions. Therefore, battle commanders must develop efficient planning and problem-solving skills that augment the decision-making process. Reliance upon judgments, both analytical and intuitive, are part of the decision-making process. This being the case, battle commanders must be critical thinkers as well as open to the use of other metacognitive thinking skills (i.e., visualization).

Utilization of Findings:

The findings of this study report will contribute to the resources used to train and coach battle commanders at the combat training centers. The Battle Command Battle Laboratory (BCBL) will also benefit, as they continue to develop the concept of battle command and conduct battle command experiments.

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Battle Command

The term "battle command" has spread rapidly throughout the Army. At Fort Leavenworth, the Battle Command Training Program (BCTP) has trained division level commanders and staffs for almost a decade. The newly developed Battle Commander Development Course (BCDC) is given to brigade and battalion commander designees by the School for Command Preparation. The Command and General Staff College Officers Course has begun offering a course in the art of battle command. Recently, studies of battle command have been initiated by the U.S. Army War College, the National Training Center (NTC), the Joint Readiness Training Center (JRTC), the Army Research Institute (ARI), the Command and General Staff College (CGSC), and the recently formed Battle Command Battle Laboratory (BCBL). Across the Army however, there is not a common appreciation of what battle command comprises even among these activities that have been focused on it. To some it is a restricted set of battlefield activities performed by the commander on the battlefield, but to others it includes the entire range of activities performed by a combat unit commander, e.g., the training and development of the unit. Most people, naturally, view it in the context of the echelon and situation in which they operate. As to the significance of the term, there is similar variation. The concept of battle command has been referred to as both "a revolutionary shift in focus" and, at the more mundane end, as "the new buzzword for command and control."

The first goal of this study is to survey the field of those who use the term and to reach a conclusion about what the term encompasses, what is myth or confusion, and what is reasoned disagreement and to, at least, make explicit any remaining ambiguity. The second goal is to identify the core competencies of those who practice battle command. What behaviors must the battle commander be able to perform, and what attributes of the commander permit him to perform battle command skillfully? Finally, research findings concerning the two main components of battle command, leading and deciding, are discussed in the third and fourth sections of this paper. In this last regard, we can rely not only on the common wisdom of army educators but can also apply research findings from non-military fields, for example, decision making by corporate executives, the development of expertise in chess masters, and the general research field of education and training.

What is Battle Command?

In its purest sense, command is authority. It flows through the chain of command from the president of the nation to the individual commanders who must direct, control, and coordinate military forces. The British Command Manual (1993), upon which the U.S. definition of battle command is based, states,

"Thus, at its simplest, to command is to direct. Military command at all levels is the art of motivating and directing soldiers and their organizations into action to accomplish missions. It requires a vision of a desired result and an understanding of concepts, missions, priorities, allocation of resources, an assessment of risks and a continual process of re-evaluation" (p. 2).

The concept of battle command is expanded in the Battle Command Battle Laboratory concept paper (1993), which states that battle command "begins in the training a commander provides for his command and ends with the successful redeployment and recover of the command" (p. 3). The inclusion of off-battlefield activities is probably warranted. In interviews about battle command with Desert Storm commanders attending the Army War College, the commanders were asked to describe decisions that were difficult for them. Information about the resulting discussions was circulated as a memorandum for the vice director of the BCBL by Dodge (1994). There was a complete absence of discussion about tactical decision making. Leadership was discussed more than decision making. The hardest decisions and most critical skills identified revolved around personnel issues, e.g., whom to relieve. The commanders stressed their responsibility for Army families. With regard to the scope of the battle command concept, the commanders emphasized that the training of subordinates is one of the commander's most important duties. They claimed that the battle command concept is too operations-oriented and does not sufficiently address all phases of the force projection cycle.

This viewpoint is consistent with the results of a survey of 48 battalion commanders done immediately after the Gulf War, in which 16 Desert Storm commanders given a set of ten items to rank in terms of difficulty ranked "Synchronizing the operation" last (easiest) stressing instead time management issues such as "Completing tasks in the allotted time" and "Allocating their own time and concentration" and psychological issues revolving around leadership skills, such as dealing with fear and instances of atrocities (Lussier & Litavec, 1992). This was in extreme contrast to the ranking of the same items by 32 battalion commanders who had just completed a Combat Training Center rotation; "Synchronizing the operation" was rated a strong first (most difficult).

The National Training Center (NTC) has been engaged in a vigorous effort to develop battle command concepts to aid in teaching, coaching and mentoring battle command competencies. In contrast to the broad definition of battle command given above, the NTC effort has produced a more restricted view that is focused on what the commander does during the planning, preparation and execution of specific battles. In the NTC concept, battle command is captured in the visualization of terrain, enemy, and self in time, space, and purpose. Figure 1 shows a diagram that has proven very useful in coaching battle command at the NTC. A detailed breakdown of the elements shown

in Figure 1 can be found in the pamphlet Battle Command: Leadership and Decision Making for War and Operations Other Than War by Fort Leavenworth's Battle Command Battle Laboratory (Madigan & Dodge, 1994).

Figure 1. Formulation of Battle Command at the National Training Center (Madigan & Dodge, 1994).

In summary, the restricted scope used at NTC may be very appropriate to the echelons and tasks trained at the Combat Training Center (CTC), but there seems sufficient reason when discussing the required competencies of the battle commander to use a broader definition of battle command. The ability to build an effective unit, to develop and maintain discipline, to assess, select, and mentor subordinate commanders and key staff members, and to assess and train required skills in the unit are key competencies of the commander. These competencies are especially important when the commander takes command shortly before deployment as was the case for many of the Desert Storm commanders interviewed. Finally, the battle commander must be prepared to command in a variety of situations such as operations other than war and in all phases of the force projection cycle such as in deployment.

Command and Control

Before the rise to prominence of the term battle command there was a growing dissatisfaction with the term command and control. The dissatisfaction expressed itself in a desire to distinguish the functions of command from those of control. LTG Wishart III, for example, when he was commander of the Combined Arms Command wrote:

> "**Command** is the **art** of assigning missions, prioritizing resources, guiding and directing subordinates, and focusing the entire command's energy to accomplish clear objectives.
>
> **Control** is the **science** of defining limits, computing requirements, allocating resources, prescribing requirements for reports, monitoring performance, identifying and correcting deviations from guidance, and directing subordinate actions to accomplish the commander's intent."
> (1990, pp. 12-13).

A modified version of the above distinction was also made by LTG W. A. Shoffner (1992). LTG Shoffner added a number of arts to command including visualizing a future

state, and a number of sciences to control including describing interfaces. Additionally there arose a generalized, sometimes stated, notion that commanders commanded and staff controlled. This was explicit in LTG Shoffner's formulation, for at the bottom of the chart containing Command is the art of... there was a box with the words *Commander's Business*, and at the bottom of the "Control is the science of..." chart there was an oval containing the words *Staff's Business*. The shift from the term "command and control" to "battle command" was completed with the issuing of the commanding general of Training and Doctrine Command (TRADOC), GEN F. Franks' 5 April, 1993 memorandum on Battle Command which stated, "I have stopped using command and control -- not because I like to invent new terms, but because it has too much excess intellectual baggage that I find gets in the way in discussing the art of command."

Historically, the command and control distinction was used in the field of missilery. Commands were the initial instructions that aimed the missile to the target and controls were the instructions that made midcourse adjustments to keep the missile on target. When applied to battle, there is a gray area between the two functions; how different must an order be to represent a new command rather than an adjustment to the current mission? Moreover, there does not seem to be much practical significance, as far as unit effectiveness, in determining whether a particular directive was control or command. Further, the successful commander must direct, control and coordinate his forces. He must be able to accomplish all three aspects to achieve a synchronized outcome. It seems foolish to argue whether the commander's ability to decide on good workable plans (command function) is more or less important than his ability to control his forces during execution and thus to make the plan occur as visualized. The commander must be able to do both. While it is true that currently, much staffwork is involved in the detailed reporting and coordinating that makes control during execution possible, it is no less true that considerable staffwork is involved in developing the accurate picture of self, terrain and enemy that make good command possible.

Why then, has the term **command and control** fallen out of favor in the U.S. Army? What is the "excess intellectual baggage" referred to by GEN Franks? If the functions of command and control do not really need to be distinguished, then what does? What does make sense conceptually is to separate the function of command from the system which supports command, the C⁴I system that gathers information on enemy and friendly status, does analysis and planning, prepares and disseminates orders, monitors and controls execution. This C⁴I system is designed to support the commander (and his key staff) as they perform the functions of command and control. The distinction is clear. The current NTC dictum, as cited by Madigan and Dodge (1994) is, "visualize the terrain, enemy, and self in time, space, and purpose" (p. 13). This is a requirement mirrored in Sun Tzu's (see Griffith, 1971) advice. Accurately assessing the situation, the military significance of terrain, enemy capability and intentions, own force capability, and the higher commander's intent have always been the battle commander's functions. Also, the successful commander has always benefitted from the singleness of purpose, the willpower, moral force and the ability to control his forces in order to make

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his concepts happen on the field. These are the functions, relatively constant in the history of war, that are comprised in the definition of battle command. In contrast to this constancy of function, the support system has undergone and will continue to undergo vast change in capability just as weapon systems have. Thus, the important distinction is not between the function of command and the function of control but instead between the functions of command and control and the systems which support the exercise of these functions.

As the command and control (C^2) (or more accurately C^4I or C^3I) systems grew to their current size, they moved beyond the span of control of the commander. They may have to some extent usurped the functions of command and control leaving the commander in the position of a spectator to command and control, unable to influence the process as much as he would like. Lessons from the CTCs and especially the drive to speed the decision making process and thus the tempo of the fight, spearhead the effort to put the commander back in the C^2 driver's seat. The abbreviated and rapid decision making processes are currently being developed doctrinally at CGSC and other TRADOC schools.

The motivation for the change in terminology from **command and control** to **battle command** becomes clear. The term **command and control** brings the image, not of the functions of command and control, i.e., battle command, but rather of the too cumbersome human-machine process system that supports C^2. As the future C^2 systems that take full advantage of information-age technology are developed it must be clear to all that the goal is to support the battle command function instead of, to quote GEN Franks, "to make more efficient a worn out C^2 engine."

Care must be taken not to throw the baby out with the bathwater. Observers at the recent battle command focused rotation at NTC (94-08) noted the extreme importance of adequate control measures, procedures that adequately conveyed maintenance status of equipment, a systematic and logical terrain analysis and intelligence preparation of the battlefield (IPB), use of doctrinally precise terminology, and employment of a deliberate planning process. It is through such doctrinally established practices that synchronization of forces can be achieved. While much staff effort is required in the exercise of these procedures, it is the commander, through the training and development of his unit, that establishes the discipline that makes synchronization happen. Separating "battle command" from the "control function" could be a dangerous mistake. In this regard, it seemed appropriate that when field manual (FM) 100-5 (1993, June) introduced the term battle command, it stated "control is inherent in battle command" (p. 2-15), and it termed battle command a combat **function**. Originally, the 1993 version of FM 100-5 retained the command and control battlefield operating system (BOS) along with the other six operating systems: maneuver, fire support, intelligence, logistics, mobility-countermobility-survivability, and air defense. This seemed very apt because battle command is a function responsible for the direction, control and coordination of all seven operating systems, including the C^2 system that

supports battle command. However, an amended version of the FM eliminated the reference to a command and control BOS and instead listed "seven combat functions" (p. 2-12) which, in fact, have the same names as the old operating systems except that battle command has replaced command and control. This may have the unfortunate effect of clouding the distinction between the battle command function and the operating system which supports it, and in effect making battle command only the new buzzword for command and control.

Art and Science

Distinguishing the Art versus Science of battle command is another attempt to separate the battle command functions from the technologically based support systems. This attempt is reflected in the previously stated quote, "command is the art of... control is the science of..." This notion is very popular, as is the phrase "the art of command," which is even included in title assigned to this report. The idea of battle command as an art is popular because battle command is hardly a cut and dried, proceduralized business. Emphasizing the art emphasizes the creative and innovative aspects of the strong commander. Nonetheless, the art versus science issue is a simplification which adds more confusion than clarification. Command, as with most complex endeavors, encompasses both art and science, among other aspects. Understanding of the principles of war, and tactical maneuvers, and sound military reasoning are fundamental aspects of battle command and are theoretical and scientific in nature.

Science is characterized by study, method, and the development and application of theoretical principles. The term military science is not a misnomer. Knowledge and application of technique is a hallmark of the expert in all fields, and the learning and development of technique is also largely scientific. Battle command can be considered to be scientific in the sense that the proficient battle commander has acquired a knowledge base as well as studied the application of techniques of battle command.

Art is involved in the skillful application of principles and methods and exercising the creative and intuitive faculties. It is clear that there is a strong component of art in battle command. For example, the judgment required of a commander walking the fine line between adjusting his plans to updated information (that is, maintaining and using a running estimate) and too frequently making last minute disruptive alterations to the plan can be considered an art. Knowing how to balance the admirable but opposite qualities of boldness and caution also would seem to be reasonably classed as an art.

A similar argument has been made in the chess world. Whether chess is an art or a science is an often debated issue. Many chess solutions appear beautiful and elegant, that is, artistic. The "art versus science" controversy is also similar to the nature-nurture controversy that raged in developmental psychology for a time (for example, see Anastasi, 1958). Undoubtedly both nature and nurture (analogous to art and science) exercise significant effects upon developmental outcome, and the attempt to assign

percentages of importance has proved a fruitless effort. With regard to chess, there is both science (because of a strong reliance on theory and principles) and art (because of the creative and intuitive aspects of planning). Every top level chess player must be strong at both. Additionally, chess is considered to be a craft (or skill) because of the common use of technique, that is, tried and true methods of the expert. These

Figure 2. The successful battle commander cannot be weak in any aspect of his profession.

techniques constitute knowledge that the expert can apply when he or she recognizes appropriate situations; there is no need for creative thought of either an intuitive or analytic character. Also chess may be viewed as a sport because of the competitive aspects such as will to win, emotional effort, focus of concentration, and the ability to control the emotions during the often back-and-forth struggle. These personal qualities are found in all chess champions and go beyond art, science and technical knowledge (Mengarini, 1991). Naturally, one would never refer to battle command's "sporting" aspect but certainly the qualities of will and the fighting spirit are of major importance (See Figure 2).

Technology, Information War, and Digitization

To many, the term "battle command" conjures the images of futuristic technology and "digitized" units with a commander viewing his unit's activities, locations, logistics status, etc. automatically, in real-time, without the aid of a large staff - a Captain Kirk commanding boldly from the bridge of the Enterprise. The Battle Command elective course offered at the Command and General Staff Officers Course essentially exposes the students to the latest command and control technology. In a sense, the connection between battle command and technology is essentially the reason for the term battle command; so that we won't, as General Franks put it, "be captured by our current command post fixations, large tactical staffs, nor our current programs to make more efficient a worn out C^2 engine" (p. 2). If we focus on the true functions we are intending to support - those unchanged battle command imperatives: developing a competent and well-trained unit, deciding on sound workable courses of action, and leading soldiers to accomplish the missions while protecting the force, then perhaps we

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will remember that it is these functions the advanced technology is expected to enhance. Perhaps we will not make the mistake of merely enhancing the command and control system that currently supports battle command. Still, while battle command and technology are connected, there is a strong possibility of confusion of the fundamental distinction that must be made between the battle command function and the technological system that supports it.

Despite the danger that it will become so, the term <u>battle command</u> represents more than "a new buzzword for command and control." The term "command and control" has become too associated with the command and control support system, e.g., the intelligence processing, IPB, mission analysis and military decision making process, communication systems, synchronization matrix, status reports, operations orders preparation and dissemination - that is, the system that supports the command and control function. The term <u>battle command</u> represents the function of developing and leading a fighting unit. The true distinction is not one of art versus science nor is it command versus control. Regardless of how advanced or primitive is the technology that supports battle command, or how powerful that technology may become in the future, the battle command functions that are supported change little. The commander must build a competent unit, have a proficient knowledge of his business, decide on sound courses of action, and possess the force of will required to lead the unit to victory.

Battle Command Competencies

The complexity of battle command means that there can be no single, comprehensive set of competencies, which would serve as a checklist to qualify the complete commander. Instead various efforts have identified sets of competencies, largely overlapping, at various degrees of detail, and at differing organizational levels. Together, they paint a picture of the requirements of battle command. The terms leadership, battle management, and command are generally used interchangeably. Sometimes distinctions are drawn, but these tend to be artificial - made more for reason of "turf" than practicality. Field Manual 22-103 states "Senior professionals blend the best of command, control, leadership, and management into a personal strategy for organizational success" (p. 43) and quotes General John A. Wickham, Jr.

"... I think the Army would make a serious mistake if we made a distinction and said, 'You are a manager, and you are a leader.' ... So my philosophy is that we are all leaders! We also must be responsible managers or stewards of resources entrusted to us. We would make a serious mistake to think that we could be one, and not the other."

A useful distinction is made in U.S. Army doctrine between three levels of leadership: direct, organizational, and strategic (Draft FM 22-103). At the direct level (up through about brigade level), the leader can personally interact with all elements of his command. As a leader moves to the organizational (an intermediate level through

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approximately corps commander), and strategic levels, greater discretion is afforded the leader (Jacques, 1977). According to Mumford, Zaccaro, Harding, Fleishman, and Reiter-Palmon (1993), demands to identify, manage, and solve problems become more intense. Skills such as political competence, cultural competence, consensus building, and negotiation become more significant at the strategic level.

National Training Center Studies

An insightful study was done over a period of years by Pence and Endicott (unpublished study; see also, Pence & Endicott, 1985) which drew upon the accumulated wisdom of NTC observer-controllers. Studying officers at the direct level of leadership, Pence and Endicott (unpublished study, p. 7) derived a list of six Airland Battle Leadership Factors. These were:

1. Leaders must be proficient at both the Art and Science of War (i.e., leaders must have technical and tactical knowledge and the skills required to translate knowledge into action).

2. Commanders must develop subordinate leaders capable of seizing and exploiting opportunities on the battlefield, and trust these subordinates to take such actions within the intent of the commander.

3. Leaders at all levels must "see" the flow of the battle as it develops with an understanding of the role of the terrain, enemy, weather, and other factors which will continue to shape the battle.

4. Leaders must demonstrate creativity and initiative in aggressively exploiting opportunities created by weaknesses in enemy operations.

5. Leaders must possess flexibility and the capability to rapidly adjust plans and operations to changing situations.

6. Leaders must develop subordinate leaders' frames of reference and clearly communicate the commander's intent such that subordinates understand the objectives of the mission and can act in a synchronized fashion under degraded communications.

Observers at the 94-08 battle command focused NTC rotation watched the brigade commander, task force commanders, engineer, and field artillery commanders. They identified several hundred specific instances of battle command competency. Analysis grouped the observations into a set of 30 competencies which categorized the specific acts observed during this single rotation (Battle Command Focused Rotation Report, 1994). While greater in number than the above Pence and Endicott list, the two are very similar. The focused rotation list is shown below.

The battle commander must:

1. be tactically and technically proficient
2. synchronize assets
3. protect the force
4. be responsive to higher commander, understand relationship with higher, and maintain mission focus
5. see own force accurately
6. visualize range of enemy options
7. visualize terrain and its military significance
8. visualize the fight
9. think incisively and ask critical questions
10. select critical time, place, and activity for himself
11. prioritize and allocate resources
12. manage time and provide subordinates sufficient time to plan and prepare
13. anticipate system requirements
14. be decisive and resolute
15. use a running estimate to make appropriate changes to the plan without vacillating unduly or making too many last minute changes
16. react to the unexpected
17. direct and supervise
18. communicate effectively using doctrinal terms
19. make intent clear and confirm subordinate understanding
20. provide focus to planning and preparation
21. be confident, inspire confidence, and project positive moral and physical presence
22. motivate the unit
23. develop competent subordinates who can function in his absence
24. establish and maintain disciplined units
25. develop a climate for teamwork
26. control his forces in battle
27. exercise tactical patience
28. attend to all aspects of combat power, not just those that match the commander's interests or proficiencies
29. continue to learn his craft and improve his skills
30. preserve his physical and mental stamina

At this level developing competent subordinates and building a well-trained, disciplined unit, having a dynamic and accurate picture of the battlefield elements, formulating simple yet effective plans, and having the strength of character to enforce one's will are the essential elements of leadership.

Traits of a Leader

The NTC studies discussed above provide a good idea of what is necessary to be a

successful commander at the direct level. Do the required competencies change for commanders at higher levels? In the Battle Command Training Program (BCTP) seminar (see BCTP course materials, 1994), several formulations of leadership traits are discussed. One well thought out list by General Omar N. Bradley contains 9 items as shown in Figure 3. First, Bradley mentions being able to recognize, select and train junior leaders. This ability, essential to building a competent unit is often neglected. This is probably because historical analysis focuses on the actions the leader takes during the battle, not perceiving the critical actions that must have occurred prior, to develop the unit. Second, Bradley states the good leader must know his job, referring once again to the basic tactical and technical knowledge which requires great effort to acquire and maintain. It has also been stated that the commander must know not only his job but the job of his subordinates in order to teach, coach, and mentor, and otherwise develop a proficient and well-trained unit. Third, Bradley states that the commander should have a proportionate degree of interest in every aspect of his job, which is quite similar to item 28 in the focused rotation list (Attend to all aspects of combat power, not just those that match the commander's interests or proficiencies). This would seem to be a worthwhile observation as it points to a fairly common failing of leaders involving both self-discipline and habit. Fourth, the commander must have mental and physical energy. Fifth, Bradley states that the commander must have human understanding and consideration for others, an aspect stressed by others, for example, General J. Lawton Collins (1990), quoted later in this report. Sixth, the commander must be stubborn. This quality is stressed by BG H. Wass de Czege (unpublished notes)--

> "Leaders must have tenacity to win. When the fight really gets mean,

★★★★★

Traits of a Leader

General of the Army Omar N. Bradley

A Good Leader:

Must be able to recognize, select, and train junior leaders

Must know his job

Should have a proportionate degree of interest in every aspect of his job

Must have mental and physical energy

Should possess human understanding and consideration for others

Must be stubborn

Should have a good personality

Must have character

Must have luck

Figure 3. General Bradley's nine traits of a leader (BCTP course materials, 1994).

soldiers look for any excuse to pull back. The ability to stay one more round, five more minutes, or one more assault is often the difference between victory and defeat" (p. 2).

The next two traits on Bradley's list are: the commander should have a good personality, and must have character. Unlike some theorists who try to define the *ideal* personality of a commander, Bradley simply states that it must be *good*. Many equally effective commanders can be noted who have greatly differing personalities (for example Bradley himself, and Patton). Rather than specifying a *correct* personality it is more appropriate to state only that the personality must be free of major defects. Finally, Bradley states the commander must have luck. While others, for example, General Matthew Ridgeway (BCTP, 1994), speak of luck as an important leader trait, this would seem a difficult trait to measure or to develop. Perhaps the generals wish to emphasize that good commanders can have adverse results on the battlefield and poor commanders can occasionally be very successful, so one needs to be careful in judging acumen solely by outcome.

In the civilian arena, leadership traits have been studied by the Leadership Development Task Force, comprised of a large number of social scientists. Bothwell (1983) reports findings from the task force which has identified critical skills for a leader. At least eleven traits are highly correlated with effective leadership. These traits are shown in Figure 4. The findings of this task force are consistent with the conclusions of military theorists. Technical competence, planning and organizational skills, intelligence, and the ability to be effective and efficient generally relate to job performance aspects stressed by many military writers. Getting along with others, and the ability to make use of group processes relate to leadership abilities involved in directing and motivating others. Motivation to self and others and the strong desire to achieve task result in the required commander trait, willpower. Finally characteristics of self-control, emotional stability, and decisiveness would seem to constitute the minimum elements of what Bradley calls a good personality.

Eleven Leadership Traits

Technical competence
Planning and organizational skills
Intelligence
Ability to be effective and efficient
Getting along with others
Ability to make use of group processes
Motivation to self and others
Strong desire to achieve task
Self-control
Emotional stability
Decisiveness

Figure 4. Traits found to be highly correlated with effective leadership by the Leadership Development Task Force (Bothwell, 1983).

The Concepts and Doctrine Directorate (CDD) of the Command and General Staff College (CGSC) developed a theoretical model that attempted to identify those characteristics that are essential to successful command (CDD Memorandum, 1993).

Following Clausewitz (1832), they identified four broad characteristics: courage, vision, determination, and strength of character and mind. Courage involves both a willingness to face danger and to accept responsibility for command decisions. Vision involves both the intuitive feel to discern the "truth" of the battlefield and to see the battle dynamically. "It is judgment informed by history, based in theory and doctrine, and seasoned by experience" (Memorandum CGSC Art of Command Action Plan on Teaching the "Art of Command" at the U.S. Army Command and General Staff College). Thus, vision incorporates the sum of the leader's professional knowledge and understanding. Determination is based on the courage of one's convictions, self-confidence, and the tenacity to pursue goals in spite of doubt, confusion, ambiguity, criticism, or resistance. This captures the strong will that is often mentioned by military writers. Strength of character and mind involve fidelity to the Army professional ethics, values and standards: honor, integrity, duty, and selfless service.

LTG Collins, Jr. (1978) writing of tactical level commanders emphasizes three roles, that of trainer, teacher, and student. Again then the emphasis here is on the business of war, becoming tactically and technically proficient and building a proficient unit. LTG Collins adds three other qualities to these roles, integrity, terrain appreciation, and presence.

Intellect, Study, and Common Sense

How essential is intelligence as a general trait of battle commanders? Madigan and Dodge (1994) list 11 famous military figures as a sample of those who had tactical/operational genius and emphasize two common traits: superior intellect and repeated, multiple, relevant, warfighting experiences. While this does not really constitute any empirical evidence that a high general intelligence is necessary for proficiency as a battle commander, it is certainly a reasonable conclusion. Also, as mentioned earlier, intelligence was found to be correlated with leadership by the Leadership Development Task Force. Other fields, however, do show some indication that a person can rise to very high levels of achievement without necessarily possessing what would normally be termed as intellect. For example, can a baseball manager be extremely baseball-smart, making very astute decisions, and having a complex technical grasp of the game, without in general being exceptionally intelligent? Can an auto mechanic possess a fine intuitive ability to diagnose engine trouble without a concomitantly high general intelligence? In chess, a number of studies have tended to show that general intelligence, as well as verbal fluency or mathematical aptitude, are not especially well correlated with chess skill (Holding, 1985). Holding cites studies by Cleveland (1907) who concluded that chess skill was completely unconnected with broader mental endowments. In a later study by Djakow, Petrowsky, and Rudik (1927), also cited by Holding, eight strong chess players from the Moscow tournament of 1925 were given an extensive psychological battery. None of the chess masters were found to be outstanding in any general way except for greater than average score on a measure of willpower. The chess masters had better chess-specific visual memory; however, they did

not have better generalized visual memory than their counterparts in the general population. Chess, like music and mathematics, is a relatively restricted field which has produced prodigies, young children with little life experience, who can nonetheless perform at a world-class level. Thus, perhaps, great success in a narrowly defined field may be possible without high intelligence, while this may be more difficult in a field requiring broad appreciation.

In contrast, several writers emphasize the need for general cognitive intelligence in the military. Jacobs and Jaques (1990) studied 101 Army general officers at four ranks, collecting interview data on leadership and leadership development. Overall, 72% of the general officers spoke about cognitive task requirements of general officers, ranging from 100% for the rank of General to 64% at Brigadier General rank. Jacobs and Jaques (1990) present a theory of leadership requirements which is based on cognitive capabilities. The theory uses a set of increasingly complex abilities ranging from information processing to metacognitive sensitivity. The set of abilities is laid against a set of seven (VII) stratified system strata ranging from low production level (Stratum I, shop floor) to high corporation level (Stratum VII, Corporate CEO) representing a range of organizational leadership levels. Simply, the theory is that one must possess increasingly complex cognitive capabilities to successfully function at higher strata. These conclusions, however, are directed to the functions of the general officers as senior executives in a large and complex organization rather than as battle commanders at high echelons. This is especially clear when time span (i.e., a horizon indicating the maximum time allowed for task accomplishment) is given as 20 years for Stratum VII level. Still, at high levels of command, there can be little doubt that a keen analytical mind and flexibility of intellect are significant assets.

When speaking to U.S. Army Command and General Staff College in 1949 about leadership at higher echelons, then Chief of Staff of the Army, General J. Lawton Collins stressed the human touch but also indicated intelligence as the next major quality of importance. He admits, however, that when discussing his concept of intelligence with a psychologist, the psychologist disagreed with his definition of the term. General Collins defined his concept as "the ability to adjust oneself to unforeseen circumstances" (See items 15 and 16 on the battle command focused rotation list above). General Collins (p. 5) stated:

> "The difficulty always arises, particularly in war, when something
> unexpected develops, something that you have not foreseen. Then what do
> you do? It is usually better to stick to a relatively poor plan than to be
> always varying, but on the other hand, to stick obstinately to something that
> is no longer applicable to the changed circumstances is silly."

With regard to intelligence, General Collins continued with the following interesting observation.

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"But, you must apply that intelligence to the handling of men. It is pretty difficult to put your finger on what is tactlessness. What is lack of judgment? But, I think most of us have had enough experience to know what I am driving at. You must temper this intelligence to suit the men and the situation with which you are confronted. And unless you do that, then your intellect is of no value at all. And yet next to the human touch, I say the second quality that is essential to leadership is a fine intelligence."

The requirement for high intellect may be debatable, but one conclusion which is more clear is that successful battle commanders must always be students of their field. This involves not only the learning of technical knowledge, doctrine and principles but also development of the ability to apply the principles in specific situations, an ability based on experience and practice. Moreover, constant advancements in the field would soon leave behind those who did not study. Battle commanders at the U. S. Army War College expressed the opinion that a love of the field was required that constantly motivated the learning process (Dodge, 1994). One did not study because it was required for the job; this alone was not enough motivation. One former commander stated that as he drove along the highway and saw hills, he would assess their military significance and devise plans to assault them. A similar observation was made by Kotov (1971) about chess masters. He claimed the top grandmasters could not pass a game in play or look at a set of chess problems without trying to solve them. Kotov implies that this passion for the game is a requirement of world level achievement.

In a 1993 survey of 45 former commanders at Fort Leavenworth (Lussier, unpublished survey) the commanders rated each of 74 items on importance for a battle commander from 1 (least important) to 5 (most important). Overall, the highest rated quality was common sense (4.87 rating) compared with judgment (13th with a 4.44 rating), creativity (53rd with a 3.87 rating) and intelligence (62nd with a 3.71 rating). However, common sense is a quality which is difficult to define. A familiar stereotype is the brilliant scientist who, while he may have a powerful intellect and grasp difficult concepts in his field, has no common sense and so acts foolishly even when judged by the standards of ordinary people. Common sense implies simple and workable solutions rather than complex and elegant solutions. Because the quality of common sense is most apparent when it is lacking, it is, in part, associated with avoiding making mistakes rather than doing brilliant actions.

Experts and Novices

What factors or skills do experts possess which differentiate them from novices? Shanteau (1988) has pursued the answers to such questions and has identified some of the factors and characteristics of experts.

Shanteau (1988) has identified six decision strategies used by experts. The first strategy suggests that expert decision makers make adjustments by using subsequent

feedback in dynamic environments. This contrasts with the novice who is characteristically rigid and possesses a blind commitment to previous choices. Secondly, expert decision makers rely on others either by group interaction or by consulting with colleagues and subordinates. By doing so there is the opportunity to receive feedback and assistance from others allowing for new perspectives and insights. A third characteristic is that the expert seems to learn from past decisions and thus make appropriate changes in future decision strategies. Shanteau states, "...experience per se is not sufficient to produce expertise; the important thing is what is learned from the experience" (1988, p. 208). Fourth, experts use and develop (often unconsciously) informal decision aids. Examples of decision aids are written records and calibration guides. By using such tools, the decision maker is protected from some common decision and judgment biases. In fact, Edwards and von Winterfeldt (1986) argue that experts, of necessity, will adopt whatever aids are needed to assist their decision making. Fifth, expert decision makers seem to avoid large mistakes. Close is good enough at times. It seems to be understood that the key is to get close by avoiding really large mistakes. Getting a ball park estimate is a common first strategy. This skill is often referred to as scoping. ARI has recently helped to add a block of instruction on scoping to the curriculum of the Combined Arms and Services Staff School, and is currently testing the effectiveness of the instruction. Finally, experts seem to follow a divide-and-conquer strategy by breaking large problems into smaller parts, find solutions to the parts and put the partial solutions back together.

Besides the six decision making characteristics of experts, Shanteau (1988) has also identified psychological traits of experts. Experts have highly developed perceptual and attentional abilities allowing for the extraction of pertinent information. This is coupled with a sense of what is relevant and what is not. Experts possess the ability to simplify complex problems. This trait may be related to superior pattern recognition and the ability to locate the crux of the problem. Experts can effectively communicate their expertise to others as well

High Expertise Group		Low Expertise Group	
(+)	Focus on Mission	(−)	Lost Mission Focus
(+)	Dynamic Visualization of Battlefield	(−)	Unable to Read Battlefield
(+)	Mastery of Time-Space Dynamics	(−)	Intent and Orders Lack Clarity and Detail
(+)	Able to Mass Combat Power	(−)	Unable to put METT-T Theory Into Practice
(+)	Clearly Understands Relationship with Corps	(−)	Did Not Use Corps Resources
(−)	Need Better Logistics and Fires Concepts	(−)	Did Not Understand Boundaries
(−)	Need Better Setting of Priorities	(−)	Fighting Another Unit's Battles

Figure 5. Differences observed between experts and novices on a division level planning task (Deckert, Entin, Entin, MacMillan, & Serfaty, 1994).

as handle adversity related to working under stress and pressing on when things are not going well. Experts are selective in picking decision problems and show a strong outward confidence in their decision-making ability. Experts also have an extensive and

up-to-date content knowledge of the problem space. Finally, experts seem to be more creative in discovering new decision strategies but are usually inarticulate about the process used to make a decision. Greater automaticity of reasoning seems to describe this trait for experts.

A recent ARI experiment compared experts and novices in a division level planning task (Deckert, Entin, Entin, MacMillan, & Serfaty, 1994). Figure 5 summarizes some of the results. As can be seen, the results are expressed in domain specific terms. Deckert et al. (1994) have some theoretical opinions concerning experts. First, they believe experts have a different memory structure than non-experts. The expert maintains an extensive store of specific experiences, and these relevant experiences can be retrieved quickly. The researchers hypothesized that the experts do this in part by storing and communicating information in the form of "war stories," but their data did not support this hypothesis. Although the experts had a large number of war stories, they did not report using these in decision making, relying instead on general principles. Experts are also more likely to initially have a plan of action than novices. Deckert et al. based their ideas on the constructs of schema and mental models; the expert's initial schema for the situation helps him ask the "right" questions and do the "right" analysis. Experts build and use "richer" mental models of the situation and the plan which 1) contains more and different information than the non-expert, 2) allows experts to visualize outcomes, and 3) allows experts to deal more effectively with uncertainty.

Leadership

Leadership, according to Lemon (1986), is defined as the movement of an individual or group in a particular direction. This definition is essentially the same as the military definition, involving two key components: influencing the behavior of others and furtherance of organizational objectives. The Battle Command Battle Laboratory concept paper (1993) divides battle command into two fundamental aspects: decision making and leadership. In this formulation, decision making is broader than the ordinary definition of selecting among options; it involves not only deciding, but also situation assessment, concept formation, planning, judgment, intuition, visualization, and the application of tactical and technical knowledge. In short, decision making means knowing what should be done. Leadership is the means to "make it happen" as visualized. There is a large amount of material on leadership in both the military and civilian sector. A comprehensive survey is beyond the scope of this paper. In this section we will consider several key aspects of leadership. First, leadership competencies identified by the military will be compared with those found in civilian studies, in particular, the efforts of the Leadership Development Task Force. Next, some issues involved in leadership during times of rapid change are considered. Some research on leadership style is then considered, and finally, two important aspects of leadership - communication and training - are discussed in more detail.

Leadership Skills

Leadership skills have been widely studied outside of the military, in an effort to detect which skills are necessary to increase the probability of good leadership. Using data from the Leadership Development Task Force, Hickman and Silva (1984) have categorized the leadership skills needed to attain excellence: Set goals, establish policies and procedures, organize, motivate, and control people, analyze situations, formulate strategies and operating plans, respond to change through the development of new strategies and reorganization, implement change by issuing new policies and procedures, get results and produce respectable growth, profitability, and return on investment. Clearly, this formulation is more a list of duties or performance categories of the leader and does not distinguish skills applicable to leadership from those applicable to decision making.

More to the point is the work of Hutchison, Kirkhorn, Shmikler, and Wills (1988) who also analyzed data of the Leadership Development Task Force. They organized leadership skills into information managing skills and people managing skills as shown in Figure 6. Most of what they consider information managing skills, i.e., problem solving, decision making, and planning will be considered in Section IV of this report. Two items have significant leadership aspects. The first is the emphasis on credibility. Not only must the leader possess performance technology, i.e., be

Information Skills	People Skills
Performance Technology & Credibility	Communications
Problem-Solving Skills	Networking
Decision Making	Negotiation
Goal Setting	Conflict Management
Planning & Organizing	Delegation
Implementation	Participative Management
	Motivation
	Coaching
	Mentoring

Figure 6. Management skills are divided into information management and people management skills (Hutchison, Kirkhorn, Shmikler, & Wills, 1988).

able to perform with excellence, he or she must also be *perceived* as knowledgeable and skilled by his or her peers, superiors, subordinates and clients. The last item, implementation, involves putting into operation the actions determined during the problem solving or decision making. Implementation skill also has significant leadership aspects insofar as it requires the ability to motivate, control, and direct people and involves the leadership trait mentioned earlier, the ability to make use of group processes.

Without people managing skills, the information management skills are incomplete. The nine people managing skills are important components of leadership. The first skill involves interpersonal communications. This has been well recognized by the military and is included as a leadership competency at all three levels (direct, organizational, and strategic) of military leadership. Generally, this skill involves the content and quality of interaction among people defined by both their observable behavior and interaction, the information transfer, and the feelings that are associated
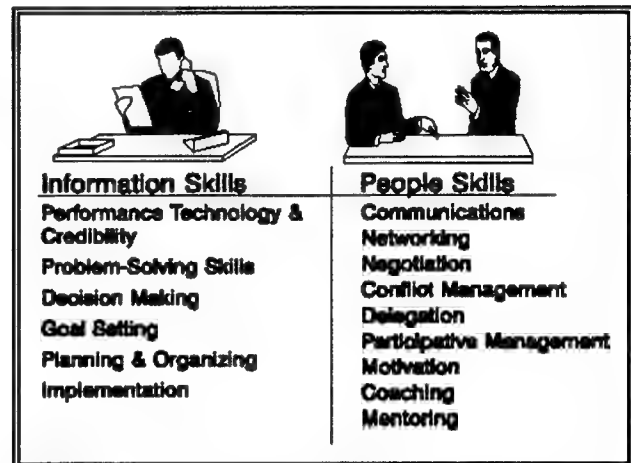
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with them. Communication skills are discussed separately in a later section. Similarly, networking involves communicating with professional colleagues and peers for their mutual benefit in terms of sharing advice, information, resources and support. Negotiation is another important skill. Successful negotiation skills result in a purposeful communication ability whose goal is to arrive at a solution that all parties are content with and with the objective that individuals will be motivated to collaborate, trust and believe in each other. Relatedly, conflict management, allows for the resolution of problems and conflict situations among others while preserving the dignity of those involved.

Delegation and participative management are skills which relate to interaction with subordinates. The former is the act of entrusting certain responsibilities and authority for a portion of one's job. Often the intent of delegation is not because the delegator does not want the job but rather wants to motivate the delegatee. Delegation of authority is important in the development of subordinate leaders and in building initiative. Participative management engenders an environment in which people feel freedom to participate in making decisions, employing initiative, and taking responsibility for their work roles. This people management skill, a command climate issue which is significant in building unit cohesion and morale, is discussed in a later section called Leadership Styles. Motivation, which steers another toward his or her goals and strengthens the commitment to reaching them, has received great attention by the military.

Coaching and mentoring are the last two people managing skills listed. Coaching puts focus on the individual's performance by intensively training, instructing, demonstrating and providing proactive opportunities to bring about an increase in productive behavior. Mentoring, the skill of navigating a less experienced person by helping him or her experience the world of the more experienced person, develops through a continuing relationship with another person. To reiterate, it is important that an effective leader develop and polish skills in the area of information management and use those skills in the context of people management.

Leadership in a Rapidly Changing Environment

Change is the hallmark of almost every sector of life, and warfighting is no exception. What additional skills are necessary for effective leadership in the context of change? Cunningham (1985) has asked such a question and contends that in a society marked by change, new leadership skills are necessary. A set of 9 leadership competencies were specified in Army doctrine (FM 22-100). FM 22-103 (draft) applied these competencies to the direct level of leadership and expanded the set to include competencies at the organizational and strategic levels of leadership. The depiction shown in Figure 7, which is taken from Madigan and Dodge (1994), indicates an increase in volatility, uncertainty, confusion, and ambiguity at higher levels of leadership. This situation is similar to leadership in a period of marked change. Thus, the skills discussed

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by Cunningham can be compared to the competencies shown in Figure 7.

Since change lessens the amount of time a decision maker has, a leader should be able to focus on the present and quickly estimate the effects that decisions may have on the future. This notion is similar to that put forth in Figure 7, as planning at the direct level becomes planning/envisioning at the strategic Level. Among the practical skills needed for planning and envisioning according to Cunningham are: The ability to distinguish between short-, medium-, and long-range planning, to sense rates of change and required

Strategic Level
- Frame of Reference Construction
- Problem Management
- Planning/Envisioning
- Rational Risk Taking
- Negotiation
- Communication
- Joint and Combined Relationship Understanding
- Political Competence
- Cultural
- Consensus Building
- Opportunity Recognition
- Systems Understanding

Volatility Uncertainty Confusion Ambiguity

Organizational Level
- Communication
- Vision
- Planning & Integrating
- Clarification of Ambiguity
- Assessment
- Development
- Evaluation

Direct Level
- Communication
- Ethics
- Supervision
- Team Building
- Planning
- Technical & Tactical Proficiency
- Decision Making
- Teaching & Counseling
- Use of Available Systems

Figure 7. Army leadership competencies at the three levels of leadership (Madigan & Dodge, 1994).

amount of lead time, to focus followers' attention on what the future holds before dealing with the present, to think practically and comprehensively about the future while planning, to remain committed to the task that must be done, to work backwards from institutional goals and objectives (or mission goals/higher's intent) covering the steps necessary to achieve those objectives, and to lead in emotionally charged situations.

Also, according to Cunningham (1985), a leader must possess skills allowing for the bridging of gaps between different interest groups. This skill has two dimensions: First, there is the communication and interaction with individuals and groups that are under the authority of the leader. Second, there are the relations with individuals, groups, organizations and institutions not under the leader's authority but who have a stake in the operation of the organization. Strodl (1993) also emphasizes this ability to consider the interests of groups other than subordinates who may be directly or indirectly affected, referring to it as constituency leadership. In the military, for example, the "constituency" would include other military activities, joint and allied forces, civilian interest groups and political entities.
Again, Figure 7 indicates that Army thinking on leadership entails similar considerations for leaders at the strategic level. Leadership competencies relevant to constituency leadership include political competence, cultural competence, consensus building, joint and combined relationship understanding, and negotiation. Strodl points out three major concerns critical to the success of constituency leadership. First, is the ability to form a

bond of trust based on the grounds of common interests. Second, the constituency leader can allow problem issues to be the focal points for group action. Finally, by relying on information gathering, intuition, sensitivity, and involvement with subordinates, joint arousal to attack problems can be achieved.

Another skill involves scanning, monitoring and interpreting events. Cunningham defines scanning as responding to the challenges of change with a systematic efficient, information-gathering technique and a certain degree of personal and institutional discipline. Monitoring involves the recording of changes so that interpretations can be made and implications considered. Interpreting is the most difficult aspect and should not be done haphazardly or in a reactive manner (Cunningham, 1985). As shown in Figure 7, the leadership competencies of use of available information systems, clarifications of ambiguity, frame of reference construction, systems understanding and opportunity recognition are similar to those listed by Cunningham.

Another skill mentioned by Cunningham is the ability of leaders to be teachers. As teachers, the leaders must know the objectives and goals of the organization and must teach (not just talk about) these continuously, so that the mission can be carried out. Figure 7 shows teaching and counseling as a competency at the direct level of leadership only, which may indicate that the importance of this ability in higher echelon leaders is not fully appreciated.

Finally, an important and difficult skill identified by Cunningham as one which leaders must possess in a context of rapid change is that of symbol managers. This ability is not reflected in Figure 7. Leaders send signals with their actions, and these signals become images held by their subordinates, their constituencies, and even their enemies. The leaders must be a proficient manager of such symbols and carefully manage the image which develops as a hallmark for the organization.

Leadership Styles

According to the Army's FM 22-100, leadership style "is the personal manner and approach of leading (providing purpose, direction, and motivation). It is the way leaders directly interact with their subordinates" (p. 69). Often, a leader's style is described as democratic or autocratic (also described as authoritarian). The autocratic leader is characterized by imposing structure and rigid standards and dictatorial governing upon the constituents. The autocratic leader uses the authority and power he has been given to obtain results. Conversely, the democratic leader is characterized by allowing subordinates to create rules and standards and participate in their government. The democratic leader uses his personality to move subordinates towards solving problems and making decisions. Even within the military, where command structure implies an authoritarian rather than democratic system, leaders vary widely in the amount of control they allow subordinates. Some research has indicated that leaders may not be very objective regarding their leadership style. In a study of school principals (Lemon, 1986),

the principals claimed that they believed in the participatory approach to leadership, or the democratic style. However, findings indicated that most principals' behavior did not reflect such a belief. Instead, principals leaned more towards the authoritarian extreme of leadership.

Recently, researchers of both military and non-military leadership (e.g. Lemon, 1986; Strodl, 1993) have rejected the notion that efficient leaders possess one of the two extreme styles of leadership and apply it in every situation. The efficient military leader is one who is flexible and exercises judgment when deciding which style of leadership fits the situational characteristics. Thus, there is no particular "best" leadership style because a successful style of leading in one situation may not be successful in another. Similarly, non-military leaders are considered most efficient if they are capable of adopting a leadership style befitting the situation rather than remaining, for example, exclusively democratic. "Situational leadership" is now a superior conceptualization of non-military leadership (Lemon, 1986) as well as military leadership:

> "[A military leader]...must develop the judgment to choose the style that best meets the situation and the needs of the subordinate" (FM 22-100, p. 71).

Lemon (1986) contends that the best way to describe a situational leader is as a *diagnostician*. The goal of diagnostic leadership should be to provide the right kind of leadership in the appropriate situation rather than becoming locked into one style and applying it generally in all situations. An example from educational leadership research indicates that school principals who are considered acceptable leaders are also considered to be skillful in "situational leadership." In other words, the key to good leadership as a principal is to apply the right kind of leadership in the appropriate situation. Lemon discusses two variables which the leader must assess. The first is whether he or she needs to provide task guidance. The second is whether the situation requires "relationship priority," by which Lemon means essentially, emotional or moral guidance. For example, suppose a first-day platoon leader comes to his commander saying, "What should I do?" The commander could choose to provide "relationship" guidance by saying, "You are a well qualified officer, who is well trained. If you do your best, I know you will do a good job." Alternatively, the commander could choose to provide task guidance by saying, "This platoon has been weak on gunnery. Give them classroom training in techniques, then take them to the range." The commander may diagnose that both types of support are required. In some situations neither may be called for, for example, the commander could say, "This platoon is weak on gunnery. I want you to improve their proficiency. If you need anything come and let me know." Situational leadership involves being able to accurately diagnose the need and respond correctly.

The military's ideas regarding leadership styles mirror those found regarding non-military leaders. Continuing with the notion that the efficient leader is an adept

situation diagnostician, FM 22-100 describes three leadership styles which have the potential to help foster training, teambuilding and competency in the subordinate when applied appropriately. First, the *directing style*, is characterized by the leader telling the subordinates what, how, where and when he wants something done. This style is obviously appropriate, for example, when time is short and there is little time for unnecessary explanation and when subordinates lack experience.

A second military leadership style is *participating*. By involving the subordinates in deciding how, what, when and where to do something, the leader is using a participating style of leadership. This style is appropriate when subordinates possess some competence and support the leader's goals. This style builds a sense of teamwork and confidence among subordinates.

Finally, the military leader may assign problem-solving or decision making authority to a subordinate or group of subordinates. This is described as the *delegating style*. This style is appropriate for subordinates who are mature, competent and supportive of the leader's goals. By delegating those assignments that are able to be delegated, the leader may unlock the subordinates' problem solving and decision making potentials as well as further develop confidence, competence and pride in the product.

The delegating style is the most efficient style because it requires the least amount of time and energy for the leader; however, before the delegating style can be used the subordinates must be trained and competent which most likely follows efficient directing and participating leadership styles. As stated above, the choice of style which best fits the situational needs and meets the overall goals of the unit is considered the most efficient style.

> By assessing the leadership needs of your subordinates, you can determine what leadership style to use.
>
> FM 22-100, p. 70

Communication and Information Flow

Volumes of research have focused on communication and information flow among individuals, especially managers/leaders and their subordinates. A full review of this research is beyond the scope of this paper; however, several important variables important in communication and information flow will be addressed.

Military commanders are required to communicate clearly and concisely. This is a skill which can be difficult to develop. Some staff and subordinates may have worked with the commander for years while others may be strangers. It is important to use doctrinally accepted terms and to use them correctly, although this alone cannot prevent miscommunications. Use of terms and their meanings should be a focus of training.

The importance of well-defined terminology is well recognized, for example, a list of doctrinal terms for commander's intent and mission statements is given in Madigan and Dodge (1994, p. 16).

Besides being a good communicator, the commander must be skilled at receiving information. A study by Kaplan (1980) of battalion command groups showed that battalion commanders who transmitted more information also received less from their staffs. That study also found substantial information loss in the processes of communicating and remembering. The fact that information loss was concentrated in specific, identifiable areas indicated to Kaplan that efforts to improve communication can be focused where they are needed. Again, this implies that training and exercise to specifically diagnose and correct communication problems can be useful.

Trust repeatedly arises as one of the most important variables in information flow research. Trust has been defined as the confidence a person has in a leader's character, strength, ability or expertise (Cumings, 1981) and as a generalized expectancy about the trustworthiness of others. This expectancy develops on the basis of enduring personality traits (Rotter, 1967). The importance of subordinate perceptions of the leader's character and competence have been emphasized repeatedly, but not generally in connection with communication ability. According to Zand (1972),

> "[Trust is] ...[considered] a key ingredient for the effective functioning of an organization. [Trust] facilitates interpersonal acceptance and openness of expression, whereas mistrust evokes interpersonal rejection and arouses defensive behavior...An increase in trust will increase the exchange of accurate, comprehensive, and timely information" (p. 3).

Zand (1972) specifically examined how mistrust in an organization affected communication and direction of information flow. Findings overall indicated that when mistrust existed in an organization, hostility and dissatisfaction were likely to increase. More specifically, a strong positive correlation was found between accuracy and information and trust and also between completeness of information and trust. A strong negative correlation was found between information loss and trust. Overall factor analysis found a variable named "Information Flow" correlating with trust at .90. This supports the conclusion that there is a strong relationship between trust and information flow. According to Zand (1972), trust affects accuracy, direction, completeness, and timeliness of information flow. A more recent study replicates and adds validity to the findings of Zand by researching communication and information flow in the educational environment. Hurst and Levine (1989) found that the greater the trust in an elementary school, the greater the accuracy and completeness of the flow of information in the school. If the trust was low, the accuracy of information flow was also low. Information flow directionality was measured upward, downward, and laterally. When there was more trust there was more upward than downward information flow.

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Beyond trust, there are other important elements of communication that facilitate its success. Neill (1983) provides some helpful hints for individuals who are supervisors and managers of others. Ineffective communicators are operationalized as those who generally tell what *they* think rather than listening to what *others* think. Assuming that communication is a process in human relations where the objective is to pass information and understanding to another, merely passing out information is inadequate. Unfortunately, this one-way channel of communication is predominant in most leader-follower organizations. Managers are encouraged to change this process by providing channels of communication for their employees. The effective communication formula is: Create a clear message, transmit it, and ensure that it has been received and understood. Neill (1983) offers some suggestions for meeting the demands of the above formula. First, the effective communicator must listen with full attention. By doing so the communicator will more likely avoid tangential details, instill comfort, avoid presumptiveness, ask relevant questions, and correct misinformation. Secondly, one should remain honest and encourage questions. Jargon should be avoided and doctrinal terms used. Leaders should watch for body language and otherwise strive to develop an intuitive feel for the success of information transfer. Finally, the effective communicator is one who talks face-to-face whenever possible.

Training

Training has a pre-eminent position among Army activities. There is little argument over its importance. Moreover, the role of battle commander as unit trainer has been mentioned frequently, especially at the direct level of leadership (brigade and below). LTG Arthur S. Collins Jr. writes "First and foremost, the effective tactical commander is a first-class trainer, and this is nowhere more evident than in a battalion" (Collins, 1978 p. 80). LTG Collins, Jr. further emphasizes the commander's role as teacher.

> "During the training process, the tactical commander also emerges as a demanding teacher. He teaches constantly, and that is chiefly what makes him a good trainer. When he observes some activity that warrants corrective attention, he asks the senior officer or noncommissioned officer present for a diagnosis and a cure but is prepared to give his own if needed. He sees a weapon in position, and just maybe he will get behind it to see if there is a good field of fire; he knows the fundamentals of his unit's equipment and how it should be employed; he has high standards and insists that these standards be met in the day-to-day training and operations of his subordinate units. When he recognizes voids in the military education of his officers and NCOs - and there are always voids - he conducts schools for his subordinate leaders.

> The teaching and stress on high standards in daily training activities are major factors in creating disciplined, well-trained combat units, without

which no tactical commander could be effective. The best commanders continue to conduct the training and the teaching even when in combat, adjusting to new conditions as they develop."

When trying to gain insight about training from fields other than the military, for example in corporations, there is a fundamental difference that must be appreciated. In business, training is a relative rarity. Teachers, for example, work each day in the classroom, and periodically, the children have a day off, and the teachers receive some "training" that they may be able to apply to improve their skills. This is a very different situation than the Army, which trains constantly. In Army doctrine, the philosophy expressed in FM 25-1 (1985), Training, is that "everything is training." Well-trained and proficient units are a fundamental necessity in the exercise of battle command; it is only through prior training and discipline that the commander can impose his will, initially on his own force, and ultimately on the enemy. Doctrinal material, for example FC 25-100 (1986), Training the Force, provides the *how* of training. The critical factor in the success of training is the commander's emphasis and personal involvement. Because Army training tends to be planned in a centralized fashion but delivered in a decentralized mode, commanders must be conscious of making the importance with which they view training apparent. It is very clear to troops when training is being done to attain a skill the commander absolutely requires them to have or it is done to "check a block," that is, satisfy an official requirement.

> Training ... encompasses the full range of duties, responsibilities, and missions of soldiers, units, and their leaders. If training is viewed as a way of life, then there can be no conflict between competing priorities. In this sense training serves as a carrier for everything a force, unit, or activity is required to do.
>
> FC 25-100 Training the Force

Besides lack of command emphasis, training may fail for other reasons. Clark (1986) has studied training in the business world and describes a number of situations when "transfer failure" occurs, that is, the skills learned during training do not transfer into job performance. The first situation can best be described as "rocking the boat." Rocking the boat occurs when new skills are brought back and perceived as non-traditional and disturb the way things usually go. Changing established procedures needs to be a considered decision by the commander. Clark also considers the negative influence of inappropriate training. When soldiers are sent to training that really does not apply to the development of unit proficiency, transfer failure is likely, not to mention that time is wasted. Training should flow from (1) a validated analysis of current job tasks and the skills required to perform them, and (2) a model of the future technological directions of the organization, agreed upon by upper leadership. Training priorities should be based on these ratings. In the Army, this is accomplished by establishing battle focus prior to training.

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"Battle Focus sets the stage for units to train as they are going to fight. It is founded on the principle that all training must relate to the wartime mission, thereby giving the unit or activity a shared direction which then serves as the focal point for the planning, development, resourcing and execution of training" (FC 25-100, p. 2-3).

Lack of "critical mass" is another typical problem situation described by Clark. Usually employees attend training in shifts over the course of a year or many weeks. This makes implementation and transfer difficult since it is fragmented among those trained, those currently in training, and those still untrained. Personnel turnover in the military has a similar effect. The Army's emphasis on collective training addresses the problem of critical mass and helps ensure that new skills are used immediately after being learned. Large-scale exercises which simulate actual conditions are important, but the training value of these will be impaired if the component skills are poorly trained. First, train the components in isolation, then train their integration.

Battle commanders must be aware that it is the results of training which are important, not the process. They must continually assess the level of unit ability. Training needs are determined based on this assessment, rather than an arbitrary schedule. After-action reviews and formal evaluations are helpful, but the commander must also rely on his powers of observation, experience, intuition and analysis to determine training needs.

Training will always be a difficult but vital duty of leadership. The manuals indicate that all missions and requirements need to be identified, and all tasks trained to standard, yet this describes an ideal rather than a realistic goal. In practice, training time and resources will be limited and training will be distracted by numerous unknowns. Should the commander shorten training time on a task to accomplish more tasks or should he strive for mastery of a task before progressing? There is no set answer. Commanders need to develop the judgment to make such a leadership decision.

Decision Making

The section is titled Decision Making in keeping with the division of Battle Command into two activities, Leading and Deciding. In truth, as mentioned earlier, a much broader range of cognitive processes is involved in decision making than simply deciding, which is technically only the process of selecting from a set of options. Identifying and forecasting problems, developing solutions, building workable plans and concepts, making difficult judgments, using intuition, thinking critically, analyzing factors logically, differentiating critical from less significant elements, and visualizing complex system interactions are some of the activities that challenge the battle commander. In fact, most battle situations are such that if the other elements, e.g., situation assessment,

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mission analysis, etc., can be done well, then deciding among courses of action (COAs) is not difficult. When two options are very close in value, it may be virtually impossible to determine which is actually better. However, it is relatively unimportant to make this determination because, since the options are close, either one, depending upon quality of execution and other factors, could lead to the better outcome. The decision process becomes important only when one option could be substantially better (or worse) than the others, yet a skillful problem solving process should reveal this difference and simplify the decision step.

This section addresses some of the cognitive processes involved in making battle command decisions. First, the general skills required in problem solving are discussed. Then, three topics of particular interest are considered in more detail: intuition, critical thinking, and visualization.

Problem Solving and Planning

A leader is inevitably called upon to solve problems. For convenience, problem solving may be organized into steps. One likely set of problem solving steps is: Problem recognition and representation, solution generation and search, evaluation and deciding, and finally, planning, organizing and implementation (Andre, 1986).

Leaders frequently begin to solve problems by recognizing that a problem exists, or more positively, that an opportunity exists. Setting goals, and determining purposes and directions are significant problem solving skills needed by the leader. After a problem has been recognized, and before a search for solutions begins, there is a phase which Andre (1986) refers to as problem representation. Other formulations of problem solving call this stage problem identification or problem definition. Problem representation consists of a transformation of the presented information into a model of memory. Specifically, identifying goals, important givens and forming a representation of the problem elements are part of this. Accurate problem representation increases the probability that a good solution will be found. Visualization, which is the ability to picture or visualize a problem geometrically or represent it concretely can aid in solving the problem. According to Andre, an issue surrounding expert-novice differences is related to problem representation. Experts have more detailed knowledge structures which can be used to classify problems into types. By doing so, experts bring to bear more effective representations. A theory of expert planning processes by Deckert et al. (1994), discussed earlier in the section Experts and Novices, makes a similar point. As shown in Figure 8, the expert's experience and underlying knowledge structure enable rapid formation of an initial plan which helps considerably in the planning process.

In addition to problem representation, solution generation is an important part of problem solving. According to Andre (1986), search represents a mode of information processing which is significant in generating potential solutions. The search process is not only involved in memory retrieval, but also in thinking. The problem elements are
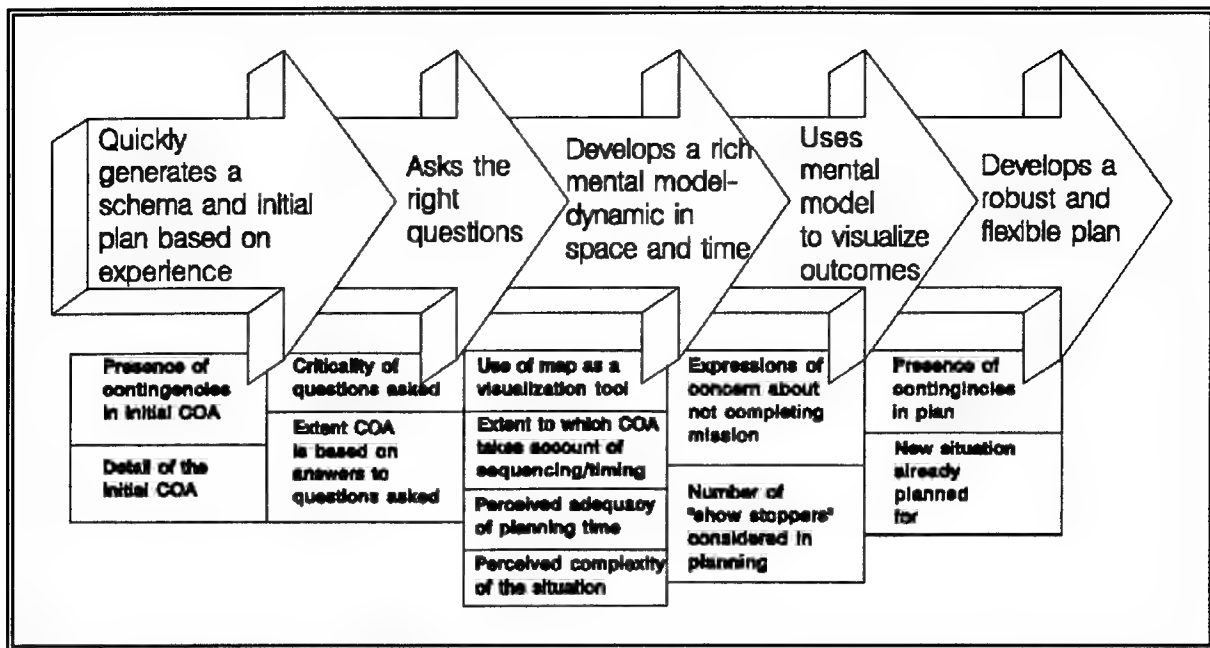
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Figure 8. A theory of the expert decision maker's process with some proposed measures (Deckert et al., 1994).

mentally manipulated in an attempt to transform the current state into the goal state. A valuable ability is creative thinking, which is the ability to break out of a mindset and realize that other paths may be fruitful. Search processes may involve heuristics and algorithms. Heuristics are general rules that provide aid in the solving of a problem by directing the search or decreasing the amount of information to be searched. Algorithms are specific procedures guaranteed to produce a correct solution when used correctly under the appropriate circumstances. The efficiency of search processes is dependent upon one's store of information and knowledge. Therefore, experts in a particular domain deal with problems more efficiently and effectively than do novices because the experts have more knowledge and information stored. Presumably, heuristics are predominantly used in real-life problem solving. Among them are: Looking for alternative representations, working backwards, hill climbing, and means-end-analysis (see Andre, 1986 for further explication and examples of these heuristics). Similarly, Hutchinson et al. (1988) refer to information processing skills such as examining creative, alternative solutions and their direct and indirect effects, and deriving solutions that are appropriate, timely, cost effective, understandable, visionary and problem eliminating.

Decision making arises during problem solving when alternative solutions are available. Decision making involves making choices between alternatives based on one's adopted criteria. The ability to objectively evaluate alternatives is aided by critical thinking skills, for example, logical thinking, which is important in organizing and assuring that each step in the solution makes sense. Critical thinking entails an effort to decide what to believe or do. Critical thinking skills are discussed in a later section of this report.

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In addition to the systematic evaluation and comparison of alternatives, decision making is frequently aided by heuristics. The development of heuristics by NASA during the Apollo program is related by Mowen (1993):

"[NASA] recognized early that the principle of "safety before everything" was simply impossible because a manned rocket would never get off the ground... The heuristics were inserted... to handle two types of situations: When insufficient time existed to think through a problem, and when intuition might lead to wrong answers.

Interestingly, the Apollo staff at first resisted the rules. They argued that the situations would never be exactly the same as those practiced. But their attitudes changed as the program matured... The mission controllers would have preferred rules like 'Protect the crew at all costs.' But this type of rule would have led to paralysis. Thus, more helpful heuristics were formulated... [One] of the first was 'If you don't know what to do, don't do anything.' This rule was counterintuitive because the controllers instinctively wanted to act when faced with a problem.

...In the case of Apollo XII, lightning struck the spacecraft as it ascended through clouds. It temporarily paralyzed the electrical systems in the ship, but somehow the spacecraft made it into orbit. Once in orbit, the question was whether or not to attempt a trans-lunar injection. Would the electrical systems hold up? In order to deal with the problem, another heuristic was employed. It stated: 'You will continue only if the next thing that happens to you - and it's the worst thing you can think of to couple with the problems you already have - is still survivable.' After checking the spacecraft's electrical systems in minute detail, the engineers could find no problems. The one system that could not be checked was the pyrotechnics that released the parachutes for the landing. But if that system failed, it would kill the crew whether or not they went to the Moon... The greatest risk in the mission was the launch. Once in orbit, you want to stay there and complete the mission - as long as the next problem is survivable. As a result of this reasoning, the flight continued" (pp. 128-130).

According to Mowen, useful heuristics are often used in industry. They are often very domain-specific. For example, here are some rules cited by Mowen from small oil firms:

- Don't bet more than two times your monthly income on any one oil well.
- Don't use your own capital on exploratory wells.
- Costs go up geometrically when you drill beyond 6,000 feet.

Most experts undoubtedly accumulate a set of personal decision heuristics appropriate to

their domain even when there is no organized effort, as there was at NASA, to develop heuristics.

A final set of problem solving skills relate to planning and organizing. The skilled leader must be proficient at designing and controlling the plans necessary to achieving goals, clarifying tasks, establishing action plans, and implementing the course of action. Communication skills, which entail speaking and listening when sharing and analyzing ideas and verbalizing or articulating an idea so as to add clarity for the speaker are important in this phase.

Planning is a specific type of problem solving involving the development of a series of steps or operations which take the individual from the current state to a desired goal state. In complex situations, such as tactical planning, many discrete decisions, (i.e., selection from options) must be made as the plan (or as candidate plans) are built. Decisions must be made sequentially; however, interrelationships among the decisions can make the process quite difficult. The situation is even more complex in group situations, such as tactical planning, where the completed plan in all its detail, is beyond the comprehension and expertise of any single planner. Integration of the component plans is a difficult aspect.

U. S. Army doctrine has, in the past, used a decision making model to guide planning behavior, i.e., generate multiple COAs, test and compare them, then select and implement one. In practice this means, at best, generate several skeleton COAs (really concepts), select one, make a plan based on that concept, then test and refine that plan. At worst, the model induces groups to develop "throwaway" and "look-alike" plans whose only purpose is to die in the selection process. Although the Army consistently teaches and exercises this decision making process, there are a number of difficulties associated with its performance. A recent review of problems with the tactical planning process is Fallesen (1993). The review includes performance trends from the CTCs and BCTP. Some of the common problems identified by Fallesen are shown in Figure 9.

There is controversy, however, whether it is useful to teach general problem solving methods outside of a particular domain. Bransford, Sherwood, Vye, and Rieser (1986) maintain that the development of a thorough domain-specific knowledge is the most important element in problem solving. They believe that extensive experience with a variety of problems is required. However, along with the acquisition of domain knowledge is the ability to access that knowledge in other contexts. According to Bransford et al. (1986) ..."[what is needed is]...general problem solving strategies and specific knowledge that is organized in ways that are appropriate for individual needs." It is suggested that the latter can be accomplished by informing trainees or students about the uses of problem solving strategies and allowing the trainees to practice and evaluate the effects and "conditionalize" their knowledge. Thus, general problem solving strategies and critical thinking skills are important but must be learned and cognitively integrated with the domain-specific knowledge.

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Estimate Procedures	Evaluation and Comparison of Alternatives
Failure to follow procedures.	Failure to evaluate.
Imprecise procedures.	Serial evaluation of options.
Inflexibility of estimate procedures.	Reaching early decisions.
Excessive time demand.	Inadequate war gaming.
Management of the Process	Planning and Synchronization
Failure to include required staff (poor coordination).	Incomplete planning.
Inadequate Commander involvement.	Poor planning.
Poor management of the process.	Enacting Plans and Monitoring
	Poor orders dissemination.
Information Exchange	Failure to track the battlefield.
Failure to exchange information.	
Failure to present plans to commander.	Individual Differences
Failure to communicate interpretations.	Differences in expertise.
	Differences by rank.
	Differences by military - student.
	Differences by cognitive ability.
Situation Assessment	
Failure to consider factors.	Battle Success
Failure to verify assumptions.	Staff characteristics related to effectiveness.
Failure to assess information quality.	Understanding related to effectiveness.
Failure to interpret information.	Quality of procedures related to effectiveness.
Failure to make predictions.	
Formulation of Alternatives	
Failure to track concepts.	
Generation of single alternatives.	
Inadequate concepts and contingencies.	

Figure 9. Tactical planning performance problems and issues (Fallesen, 1993).

Intuition

In cases of intuition, a decision maker reaches a conclusion, but the reasons for the conclusion cannot be verbalized; one is not consciously aware of them. The inability to explain the steps leading to the judgment or conclusion is a characteristic element in intuition.

The term intuition has always carried with it some excess emotional freight. In many cases it is used somewhat mystically. How did the mother know her child was in danger? She felt an intuition. "Womens' intuition" or "mothers' intuition" is an instinct, a way of arriving at conclusions without conscious reasoning. According to personality theorist Carl Jung, intuition is the psychological function that explores the unknown and

senses possibilities, opportunities and dangers when they are not readily apparent. It is an instinctive skill, or a trait that some people simply have, for some reason or another, which gives them an advantage in certain situations. Such notions have given the concept of intuition a bad reputation. First, most reasonable people want to reject the notion that one can know something that should be unknowable, i.e., psychic behavior. The second problem comes from the idea that intuition is instinctive. Instincts are unlearned, "pre-wired" knowledge or behavior that develops as a characteristic of a species. Jung theorized that humans were born with many of these instincts, for example, an understanding of the concept of motherhood. While human instinctive behavior, compared to the mass of human learned behavior, may be more pervasive than is generally appreciated, it is difficult to build a credible theory of intuition based on it.

According to Agor (1983), a modern proponent of intuition, intuitions are our initial impressions of people and situations based on experiences which are repressed due to conditioning. Agor argues that we have been socialized to not make decisions and judgments until more factual information can be obtained. Later, we allow ourselves to recall first impressions, and usually they hold a great deal of accuracy. Later, Agor refined his definition of intuition: "Intuition is the ability to come up with a workable solution to a problem even when data for making that decision is inadequate or unavailable" (1988, p. 19). You feel as though you have the answer but are unsure of the process and steps in getting it. Intuition is particularly useful in a situation where there is a crisis or emergency situation. In an environment where rapid decisions must be made, such as the military, and more factual information is not forthcoming, a highly developed intuition can be an efficient way of knowing and an important source for making decisions.

Agor's concept is an improvement on the traditional notions in that intuitions are experience-based rather than instinctive. Mowen (1993) contends that intuition is a store of knowledge that can be appropriately applied at the right time and under the right circumstances. Still, Agor views intuition as a special talent which lays latent in most people, and he seems fairly narrow and arbitrary in basing the development of intuition on initial impressions. Further, Agor's concepts continue to retain a clairvoyant tinge; the intuitive decision makers make the right choice even though the data are inadequate or unavailable.

Properties	Intuition	Analysis
Cognitive Control	Low	High
Rate of Data Processing	Rapid	Slow
Conscious Awareness	Low	High
Organizing Principle	Weighted Average	Task-Specific
Errors	Normally Distributed	Few but Large
Confidence in Answer	High	Low
Confidence in Method	Low	High

Figure 10. Properties that characterize the intuitive and analytic processes according to Hammond (Hammond, 1993).

Hammond (1993) considers analysis and intuition as simply two modes of

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reasoning, both of which are used to some extent by all people. Analysis is conscious reasoning based on decomposition and manipulation of elements of a situation while intuition is generally based on the unconscious appreciation of patterns of stimuli, i.e., cues. Properties generally associated with the two processes are shown in Figure 10. Analysis typically involves some reduction of the whole into its component parts for individual study. The intelligence preparation of the battlefield (IPB) process is an example of where battlefield elements are separately evaluated. Not all analysis must employ predetermined procedures as the IPB. A commander may logically analyze a possible course of action, looking for flaws in logic or timing, checking each component to see if a better option is available or checking to see if the option is supportable from logistical aspects. He does not necessarily follow a set procedure yet his activity is essentially analytic in that he is reasoning about the parts.

Consider a group that plays poker every week. Suppose one of the players, Joe, has a "tell," i.e., an unconscious mannerism that he performs whenever he bluffs or whenever he has a strong hand. One opponent may consciously catalog Joe's behavior, looking at the components individually, developing and testing theories, and eventually analytically discover the tell. This process is analytic because it involves decomposition of Joe's behavior; attention is focused on the individual elements. Another opponent may develop strong intuitive feelings regarding the strength of Joe's hand based on the general pattern of Joe's appearance and past behavior, as well as his or her own past poker experiences, without being consciously aware of the identity of Joe's tells. The second opponent also knows (or feels) that Joe is bluffing but cannot consciously identify the specific mannerism that constitutes the "tell."

Hammond, (1993; see also Hammond, Hamm, Grassia, & Pearson, 1987) with his cognitive continuum theory, argues that intuitive and analytical behavior can be induced by manipulating task variables. In other words, an individual can be predicted to behave intuitively or analytically based on certain aspects of the task environment. Hammond (1993) lists eleven task characteristics which predict an intuitive-induced state or an analysis-induced state of cognitive activity. These are shown in Figure 11. Which type of activity is likely depends on the number and salience of the cues and their

Task Characteristics	Intuition	Analysis
Number of Cues	Large (> 5)	Small
Measurement of Cues	Perceptual	Objectively Measurable
Distribution of Cues	Continuous & Variable	Unknown or Dichotomous
Redundancy of Cues	High	Low
Level of Decomposition	Low	High
Degree of Certainty	Low	High
Relationship between Cues and Criterion	Linear	Nonlinear
Weighting of Cues	Equal	Unequal
Organizing Principle	Unavailable	Available
Display of Cues	Simultaneous	Sequential
Decision Time	Brief	Long

Figure 11. Task characteristics that tend to induce analytic and intuitive processing modes (Hammond, 1993).

relationship with the predicted criterion, i.e., the conclusion. Thus, whereas previous writers had emphasized the personality of the reasoner in determining the mode of

reasoning, Hammond emphasizes characteristics of the situation.

Although theorists, such as Hammond, have developed acceptable concepts of intuition, it still remains a question whether the use of intuition is worthwhile and reliable. Recently, intuition has been promoted as a valuable skill or trait in the business world. Attempts have been made to foster the use and development of intuition in the work place.

Agor, a proponent, states his case as such:

"Managers who continue to rely solely on empirical evidence that has been sifted, digested, and analyzed may lose out to the leaders who have the confidence and competence to follow their intuitive instincts in times of rapid change" (1983, p. 53).

Managers will need to rely less on formal authority and more on intuitive judgment in order to handle the shift to bottom-up, horizontal organizational communication with sensitivity and persuasiveness...a new [problem solving and decision making] model is developing, one patterned after the emerging successful Japanese management style that blends analysis with insight" (1983, p. 49).

"Intuitive abilities were tested in a wide variety of organizations. It was found that top managers across the board were rated significantly higher than middle- and lower-managers in their ability to use intuition in making decisions on the job. Successful executives tend to rely less on fact-gathering and more on their instincts" (1983, p. 50).

"The first rule is to believe in it. The second rule is 'practice makes perfect.' The third rule is to create an environment where intuitive skills are valued" (1983, p. 53).

Lemon (1986), who is not a strong proponent of the use of intuition, states his feelings regarding the utility of intuition in leadership as follows:

"Intuition has a place in the art and science of administration, but relying on it is necessarily perilous and thus foolhardy. It is also unnecessary, for research has led to the development of demonstrably effective approaches, while revealing why other models of leadership invite problems" (p. 2).

Mowen (1993) describes over one hundred studies that have compared intuitive judgments to some objective standard. Not a single study has produced findings indicating that intuitive judgments are superior to analytical judgments. However,

Mowen does not recommend that the concept of intuition and its application in decision making be abandoned. Instead, he suggests that in a situation where time is critical and a decision must be made, one's accumulated experience - intuition - may be the best decision guide at one's disposal. Mowen uses the concept of **judgment** which is related to intuition. Mowen (1993) states "a judgment call occurs when a decision maker must make a tough choice between two or more options under ambiguous conditions" (p. 16). Judgments are made through appreciation of the various elements and using experience to "weigh" the factors when no purely analytic, mathematical or logical reasoning process clearly settles the decision. Thus, judgments may be made with various combinations of analytic and intuitive support.

When evaluating the benefits of intuition versus analysis, it should be considered that one is not constrained to using one or the other process exclusively. According to Hammond, one can oscillate along the continuum between intuition and analysis. If one views analysis and intuition as two different processes which are not necessarily at opposite ends of a continuum, they could conceivably operate concurrently and cooperatively. Using intuition to guide analysis, for example, not ignoring the feeling that a logically derived plan has a flaw, and using analysis to support and validate intuitive conclusions should be superior to relying exclusively on a single mode of reasoning. Further, there can, over time, be a transfer of behavior from one mode to the other. What was learned analytically, after much experience, can be expressed only as an intuitive conclusion with its detailed basis forgotten. Beliefs and actions which were developed intuitively, may eventually yield to logical understanding.

Critical Thinking

Critical thinking is paramount in importance in problem solving, decision making, and in exercising judgment. Ennis defines critical thinking as, "...a practical reflective activity that has reasonable belief or action as its goal. Critical thinking is reasonable reflective thinking that is focused on deciding what to believe or do" (1987, p. 10). A critical thinker tests the truth of his beliefs and questions the value of his actions. Ennis has identified a large number of critical thinking skills which he organizes into four basic areas: clarity, basis, inference, and interaction. Critical thinkers *clearly* organize and analyze, have a solid *basis* of information on which to draw, make reasonable and logical *inferences*, and *interact* sensibly with others.

The first critical thinking ability is getting clarity. By asking clarifying questions, analyzing arguments (identifying conclusions, criteria for arguments, identifying reasons offered and reasons not explicitly stated) and focusing on a question (identifying a problem, hypothesis or thesis) the critical thinker can become more clear about what is going on. Clarification is also achieved by defining key terms and understanding such definitions as well as identifying assumptions.

The second ability focuses on the basis from which an argument is made. The

question is, "Is there a reasonable foundation for the argument?" By developing the ability to judge the credibility of a source of information, by careful observation, and by possessing a relevant and accurate knowledge of the subject, the previously posed question can be answered.

Critical thinking also includes making inferences using deduction and induction, and making value judgments. Using deduction, one can discern whether one thing necessarily follows from another. When using inductive inference, one is concerned with whether the facts are explained by the inferred hypotheses, that is, is the hypothesis the best explanation for the facts? Finally, the critical thinker is aware of when value judgments (judgments about right and wrong rather than true and false) are being used.

Ennis discusses the important aspect of interaction with others as an adjoinder to the dispositions and abilities required for efficient critical thinking. Regarding interaction with others, the critical thinker will undoubtedly interact with others in discussions, debates, presentations, written pieces, etc. which require clarity, basis and inference. Therefore, the development of communicative skills becomes an important aspect of critical thinking.

Ennis' model, depicted in Figure 12, is quite complicated. Within this organization, he identifies a large number of dispositions, that is, behavioral inclinations, that must work across the four basic areas of ability. Some of these are: Seeking a clear statement of the

Figure 12. Constituents of critical thinking—in context (Ennis, 1987, p. 16).

thesis or question; seeking reasons; trying to be well informed; using and mentioning credible sources; taking into account the total situation; trying to remain relevant to the main point; keeping in mind the original and/or basic concern; looking for alternatives; maintaining an open-mind, which means (1) considering seriously the points of view of others, (2) reasoning from premises with which one disagrees without letting the disagreement interfere with one's reasoning, and (3) withholding judgment when the evidence and reasons are insufficient. Other dispositions are: Taking and changing a position when the evidence and reasons are sufficient to do so; seeking as much precision as the subject permits; dealing in an orderly manner with the parts of a complex whole; and being sensitive to the feelings, level of knowledge, and degree of sophistication of others.
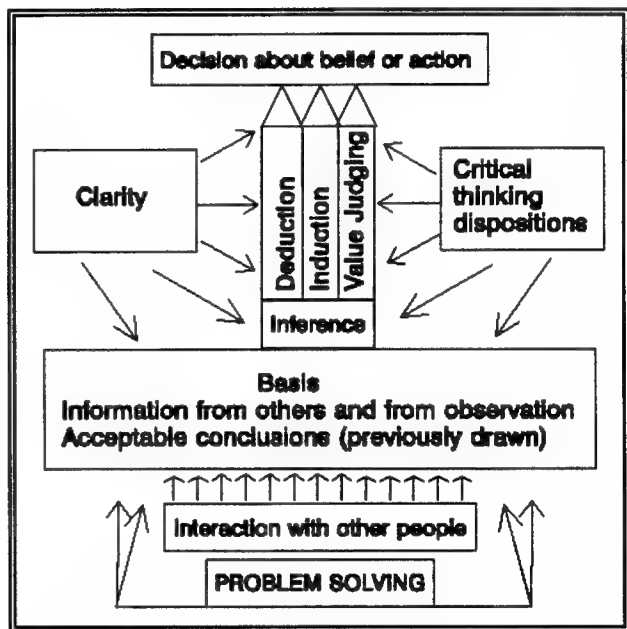
Visualization

In addition to critical thinking, visualization has received a great degree of focus in the recent past as an aid to decision making and problem solving. Nakaji (1991) describes visualization as "...the formation of 'mental pictures,' images generated and manipulated by the human mind...[These] visual images play a paramount role in producing meaningful solutions to problems" (p. 79). This narrow definition stresses the visual aspect of visualization only, rather than referring to the wider area of mental models generally. For example, the baseball player trains by visualizing himself hitting the ball. The more general definition of visualization has been frequently used in regard to battle command. The NTC description of battle command is based almost exclusively on the commander's ability to visualize self, enemy, and terrain, and, in early NTC formulations, on visualizing the future. Visualization in the NTC sense describes the commander's ability to understand the situation, to accurately know the battlefield elements, and to comprehend their potential interactions in time, space, and purpose. The notion of visualization is related to the psychological concept of mental models in which knowledge representations of objects, their attributes, and their relationships are manipulated. While the medium of manipulation may be visual, it can be logical, verbal, and abstract as well. General Cavasos shares this view of visualization. According to General Cavasos (Future Battle Lab, 1990) to have a mental image of the battlefield, a commander must have tactical and technical proficiency, know soldiers, appreciate terrain, understand weapons, equipment, and requirements for force sustainment. Thus, clearly the visualization is based on proficient knowledge of battlefield relevant objects, attributes, and relationships.

The facilitating effects of visualization have been studied in the classroom. In one study, college students were asked to solve a physics problem with the choice of several mediums to enhance visualizing the problem elements (Nakaji, 1991). Visualization can be used to check and clarify elements of the problem and to help identify relationships and better understand interactions. Findings indicated that, first, students reported great difficulty visualizing. They found it hard to change perspectives, i.e., to visualize the problem from another angle. This was the case even though most students knew the value of changing perspectives. Also, students did not "zoom in" on any particular element in their mental representation, and students reported that their visualizing amounted to a series of still frames rather than a dynamic sequence. Secondly, success in problem solving was not proportionally related to time spent in visualization. Successful problem solvers spent less time visualizing than their counterparts. This suggests that quality not quantity of visualization is most important.

Chess research in visualization has concentrated on the visual imaging aspects. Visualization ability alone does little to explain chess skill. Holding (1985) summarizes a review of chess visualization work writing "the explanatory power of imagery hypotheses tends to diminish as research proceeds" (p. 51). In a study by Binet (1966) respondents gave sensory memory and visual imagination poor press. Binet's summary states that

"the players... utilize visual memory; yet we must realize that their visual memory differs profoundly from the visual memory of a painter. It lacks the latter's concrete, pictorial quality. Though visual, it is an abstract kind of memory" (p. 160).

Some preliminary data collection on military visualization was done by Solick, Spiegel, Lussier, and Keene in 1993 (in preparation). Officers were shown plans of NTC battles and listened to audio tapes of the command net. The officers were frequently asked to specify current (visualization) and future (prediction) unit strengths and locations. While fairly obvious, it was found that visualization and prediction were most difficult for rapidly changing items such as locations early in the battle, and strengths later in the battle. The officers were given a battery of psychological tests, but correlations between performance on the tests and ability to visualize were not conclusive. The value of visualization in problem solving performance remains an area requiring further study.

As with visualization, many other aspects of battle command require continued development. In this paper, we have argued against conceptualizing the battle command function as a single, undefinable quality. Instead it comprises science, art, craft, and fighting spirit. At every level, under two broad areas, leadership and decision making, specific competencies can be identified. Some are easily trainable, some require great effort, while others may not be acquirable at all. The Army faces the continuing challenges of refining the theory of battle command and applying its principles to selecting, educating, and developing future Army leaders.

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